

CLAIMS

1. A silicon refining method, characterized in that it consists of:

filling a cold inductive crucible (1) with solid silicon;

5 melting the content of the crucible;

creating, by means of the inductive crucible, a turbulent stirring of the silicon melt (b) by bringing the liquid from the bottom of the crucible to the free surface by ascending along the central axis of the crucible; and

10 directing a plasma (f) generated by an inductive plasma torch (2) towards the melt surface for a duration enabling elimination of impurities for which the reactive gas (g_r) of the plasma is adapted.

2. The method of claim 1, characterized in that the 15 intensity of the turbulent stirring is a function of the frequency of an electromagnetic field created by the crucible (1).

3. The method of claim 1 or 2, characterized in that it consists of sequentially using several reactive gases (g_r).

20 4. The method of claim 3, characterized in that the reactive gases (g_r) are selected from the group including chlorine, oxygen, hydrogen, and water vapor.

5. The method of any of claims 1 to 4, characterized in that it further consists of, after purification of the silicon 25 melt (b):

inverting the melt stirring direction; and

injecting, as a reactive gas (g_r) of the plasma, an element enabling doping of the silicon.

6. The method of claim 5, characterized in that the 30 reactive gas (g_r) injected to dope the silicon is hydrogen.

7. The method of any of claims 1 to 6, characterized in that the silicon is processed by batches of a volume substantially corresponding to the volume that can be contained in the crucible (1), the crucible not being integrally emptied at

the end of the processing of a current batch to form a liquid seed furthering the melting during the next batch.

8. The method of any of claims 1 to 7, characterized in that, during an initial starting phase of the installation, 5 the plasma is used without any reactive gas to heat up the surface of the silicon load contained in the crucible (1), until this load reaches a temperature sufficient to make it conductive, the continuation of the load heating and its maintaining at the desired temperature being afterwards ensured by the magnetic 10 field of the inductive crucible.

9. A silicon refining installation, characterized in that it includes:

a cold inductive crucible (1) adapted to receiving the silicon;

15 an inductive plasma torch (2) directed towards the free surface of the silicon load contained in the crucible; and

a removable magnetic yoke (3) between the plasma torch (2) and the crucible (1), the yoke being ring-shaped to enable the passing of the plasma flame (f).

20 10. The installation of claim 9, characterized in that the crucible (1) includes, at its bottom, an aperture (14) having its opening controlled by an electromagnetic valve (5).

Add 327